2 In this question, k is a constant.
It is given that $2x^2 + (3k-2)x + k = 0$ has roots that are real and distinct.

Find the set of possible values of k. [5]

3 A sports club has the following members.

5 runners, 4 swimmers, 3 gymnasts

(a) These members stand in a straight line.

Find the number of ways that this can be done when all the runners stand together, all the swimmers stand together and all the gymnasts stand together. [2]

(b) Four of these members are selected for an event.

Find the number of ways that this can be done when at least one runner, at least one swimmer and at least one gymnast must be selected. [3]

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4 The coordinates of points A, B, C and D are as follows.

$$A(-4, 3) \quad B(6, -9) \quad C(15, 10) \quad D(14, -1)$$

The line L has equation $y = 11x - 75$.
The perpendicular bisector of the line AB meets L at the point E.

Find the area of triangle CDE. [7]

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